Florida Power & Light Company, P.O. Box 14000, Juno Beach, FL 33408-0420

FPL

AUG -8 2003

L-2003-201
10 CFR 50.54(f)

U. S. Nuclear Regulatory Commission
Attn: Document Control Desk
Washington DC 20555

RE: Florida Power and Light Company
St. Lucie Units 1 and 2
Docket Nos. 50-335 and 50-389
Turkey Point Units 3 and 4
Docket Nos. 50-250 and 50-251

FPL Energy – Seabrook, LLC
Seabrook Station
Docket No. 50-443

**NRC Bulletin 2003-01**
**Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors**

On June 9, 2003, the NRC issued Bulletin (NRCB) 2003-01, "Potential Impact of Debris Blockage on Emergency Sump Recirculation at Pressurized Water Reactors." Florida Power & Light Company (FPL), the licensee for the St. Lucie Nuclear Plant, Units 1 and 2, and the Turkey Point Nuclear Plant, Units 3 and 4, and FPL Energy Seabrook, LLC (FPL Energy Seabrook) the licensee for Seabrook Station hereby submit their responses to the Bulletin.

Licensees were requested to provide a response within 60 days of the date of the NRC Bulletin to either: 1) state that the ECCS and CSS recirculation functions have been analyzed with respect to the potentially adverse post-accident debris blockage effects identified in the NRC Bulletin are in compliance with 10 CFR 50.46(b)(5) and all existing applicable regulatory requirements (Option 1); or 2) describe any interim compensatory measures that have been or will be implemented to reduce the risk which may be associated with the potentially degraded or nonconforming ECCS and CSS recirculation functions until an evaluation to determine compliance has been completed (Option 2).

Attachment 1 provides the FPL St. Lucie plant response, Attachment 2 provides the FPL Turkey Point plant response, and Attachment 3 provides the FPL Energy Seabrook response. In each case, the response is provided in accordance with Option 2 of the Bulletin.

FPL and FPL Energy Seabrook are represented on the NEI PWR Sump Performance Task Force and will continue to monitor NRC and industry activities in this area. As additional industry or Westinghouse Owners Group (WOG) recommendations are made to further reduce the risk of potentially degraded recirculation functions, FPL and FPL Energy Seabrook will consider them for implementation.

The attached information is provided pursuant to the requirements of Section 182a of the Atomic Energy Act of 1954, as amended and 10 CFR 50.54(f).

Please contact us if you have any additional questions regarding these responses.

Very truly yours,

J. A. Stall
Senior Vice President, Nuclear and
Chief Nuclear Officer

Attachments (3)

IE11

STATE OF FLORIDA )
)ss.
COUNTY OF PALM BEACH )

J. A. Stall being first duly sworn, deposes and says:

That he is Senior Vice President, Nuclear and Chief Nuclear Officer, of Florida Power and Light Company and FPL Energy Seabrook, LLC, the Licensees herein;

That he has executed the foregoing document; that the statements made in this document are true and correct to the best of his knowledge, information and belief, and that he is authorized to execute the document on behalf of said Licensees.

J. A. Stall

Subscribed and sworn to before me this
8 day of August, 2003,

Roberta S. Economy
Name of Notary Public (Type or Print)

Roberta S. Economy
MY COMMISSION # DD007295 EXPIRES
June 1, 2005
BONDED THRU TROY FAIN INSURANCE, INC.

J.A. Stall is personally known to me.

# ATTACHMENT 1

## St. Lucie Plant Response
## NRC Bulletin 2003-01

### Requested Information

This response addresses Option 2 of the Requested Information in NRC Bulletin 2003-01. Option 2 requests that licensees describe any appropriate interim compensatory measures that have been or will be implemented to reduce the risk which may be associated with potentially degraded Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation functions while evaluations to determine compliance proceed. Accordingly, this response describes the interim compensatory measures that have been implemented as well as plant specific measures planned to be implemented with an associated implementation schedule.

This response is modeled after the Westinghouse Owners Group (WOG) template developed to assist licensees in preparing plant specific responses to NRC Bulletin 2003-01. Note that a description of the St. Lucie ECCS and CSS is provided in Sections 6.3 and Sections 6.2.2.2.1 of each Unit's UFSAR, respectively.

**The following is the St. Lucie Units 1 and 2 response to the six (6) interim compensatory measures listed in the Discussion section of NRC Bulletin 2003-01:**

### 1. Operator And Staff Training On Indications Of And Responses To Sump Clogging

CEN-152, the Combustion Engineering Emergency Procedure Guidelines (EPGs) which form the basis of the St. Lucie Emergency Operating Procedures (EOPs), do not currently include specific guidance that addresses a set of symptoms indicative of containment sump blockage following recirculation actuation signal (RAS) initiation. The St. Lucie Loss of Coolant Accident (LOCA) EOPs do however monitor high pressure safety injection (HPSI) pump flow during recirculation to ensure core cooling and that damage to the pumps does not occur. If sump blockage were to occur, the operators would transition from the Loss of Coolant Accident EOP to the Functional Recovery (FR) procedure, and continue to monitor/restore the critical plant safety functions. The FR procedure is used to verify the satisfactory control or restoration of all critical safety functions and to provide actions to restore and maintain those safety functions. The FR procedure is written in such a way that the operator need not diagnose an event in order to establish and maintain safe plant conditions. Safety Function Status Checks (SFSC) are used to continually verify the status of all safety functions. By satisfying the SFSC acceptance criteria, the operating staff is assured that the actions being taken are maintaining the plant in a safe condition. In parallel, the Technical Support Center (TSC) would be called on to provide guidance and recommendations using existing guidance in the Severe Accident Management Guidelines (SAMGs) to provide further recovery actions such as the use of alternate water sources for core heat removal.

Although specific symptoms of containment sump blockage are not explicitly identified in St. Lucie EOPs, initial training for the licensed operators contains specific information related to

degraded pump performance. This training is received during the fundamentals section of the program. Actions include identification, characteristics associated with the phenomena (i.e., cavitation, gas binding, etc.), indications available to monitor pump performance, and actions necessary to correct the condition. Periodically, licensed operators are challenged during requalification simulator evaluations with pump malfunctions. The actions require correct diagnosis from the available instrumentation, correct action to secure the affected pump and correctly addressing the remaining system configuration. Although not specifically part of the 2-year requalification program, correct response to degraded pump performance does rely on initial operator training, industry OE, and plant operating experience. To enhance the operators awareness of the significance of the issues discussed in Bulletin 2003-01, an Operations information brief has been issued which emphasizes the importance of monitoring ECCS and CSS pump performance during the accident recirculation phase. The information brief also discusses the proposed EOP changes and additional compensatory measures described below.

The following is a list of St. Lucie plant-specific control room indications currently available to the operators to determine the potential of containment sump blockage:

- Containment recirculation sump level
- High Pressure Safety Injection (HPSI) pump flow
- Containment Spray (CS) pump flow
- HPSI pump motor current
- CS pump motor current
- HPSI pump discharge pressure
- CS pump discharge pressure
- CS discharge header low pressure alarm

Although current St. Lucie EOPs are based on the CEN-152 strategy described above, St. Lucie will enhance the applicable EOPs to provide the operators with more specific indications of sump blockage by utilizing all available instrumentation to identify symptoms of containment sump blockage or degraded ECCS or CSS pump performance. St. Lucie will complete the applicable EOP revisions to support implementation following the six-week operator continuing training cycle beginning November 10, 2003. Implementation of these EOP revisions prior to this date is not feasible due to the scope of the required technical reviews necessary to implement the changes and the conflict with the execution of Annual Operating Examinations scheduled for September/October, 2003.

Informational training concerning NRC Bulletin 2003-01 will be provided to the technical support staff via the St. Lucie Engineering Training Program (ETP). This training, scheduled to be completed during the 4th quarter of 2003, will provide awareness of the significance of the sump clogging issues discussed in Bulletin 2003-01 and proposed compensatory measures to the engineering staff involved in supporting the TSC and emergency operations facility (EOF). A Training Bulletin on this subject has been issued to the engineering staff as an interim measure until formal training is completed.

In addition, St. Lucie will continue to follow industry and WOG efforts in this area and if any additional procedural or training recommendations are provided, they will be considered for implementation.

The proposed procedural and training enhancements and implementation schedule to address operator and staff training on indications of sump clogging provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**2. Procedure Actions That Delay The Switchover To Containment Sump Recirculation**

In Bulletin 2003-01, the NRC provides an example of a procedural modification that would delay the switchover to containment sump recirculation. This procedural change involves shutting down redundant pumps that are not necessary to provide required flows for core heat removal and containment temperature/pressure control.

For LOCAs that require ECCS injection and containment spray, pre-emptive operator actions to stop pumps or throttle flow solely for the purpose of delaying switchover to containment sump recirculation are not recommended until the impact of the changes can be evaluated on a generic basis for the following reasons:

- Operator actions to stop ECCS or CSS pumps or throttle flow result in conditions that are outside of the current St. Lucie design basis assumptions, such as single failure. This results in the potential for creating conditions that would make the optimal recovery more challenging.

- These actions are inconsistent with the current operator response using the CEN-152 EPGs that have been established through extensive operator training. The expected operator response is based on the optimal set of actions considering both design basis accidents and accidents outside the design basis. The CEN-152 EPG operator response is not limited to a specific accident progression in order to provide optimal guidance for a wide range of possible accidents.

- To be effective in delaying the switchover to containment sump recirculation, operator actions to stop ECCS or CSS pumps must be taken in the first few minutes of an accident. This introduces a significant opportunity for operator errors based on other actions that may be required during this time frame. Any new operator actions to stop ECCS or CSS pumps during the injection phase could result in increased risk due to operator error.

Any generic changes to the CEN-152 EPGs concerning isolation of an operating ECCS or CSS train during the injection phase of a LOCA will be evaluated by formal Owners Group specific maintenance programs. After any generic guidance is approved and issued, St. Lucie will evaluate incorporating the recommended guidance into plant operating documents and provide the required operator training.

For small to medium LOCAs, ECCS pumps are sequentially stopped while maintaining core cooling. It is possible to cooldown and depressurize the Reactor Coolant System (RCS) to cold shutdown conditions before the refueling water tank (RWT) is drained to the switchover level. Therefore cold leg recirculation is not required to be established, and sump blockage is not an issue.

In order to delay the switchover time to recirculation, an interim compensatory action that has been implemented at St. Lucie is administrative control of each Unit's RWT level to maximize the volume contained above the Technical Specification minimum limit. The St. Lucie RWT Technical Specification volume is 401,800 gallons for Unit 1 and 417,100 gallons for Unit 2. Both Units have a high level alarm at a volume of approximately 551,000 gallons. While the RWT volume cannot always be maintained just below the high level alarm due to water transfer manipulations, the water level is now administratively controlled at the upper end of the operating range. This change ensures that additional RWT water volume is maintained for injection into the RCS and containment. Any extension of the injection phase duration is beneficial as decay heat and containment pressure/temperature are reduced and more time is available for debris to settle prior to recirculation. This additional water volume in containment also improves available net positive suction head (NPSH) during ECCS and CSS recirculation alignment.

The administrative controls on RWT volume to address this compensatory measure provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete. St. Lucie will continue to follow industry and WOG efforts in this area and if any additional recommendations are provided, they will be considered for implementation.

**3. Alternate Sources To Refill The RWT Or To Inject Into The Reactor Coolant System**

Los Alamos National Laboratory technical report LA-UR-02-7562, "The Impact of Recovery from Debris-Induced Loss of ECCS Recirculation on PWR Core Damage Frequency", identifies that operator action to refill the RWT after injection provides the potential to reestablish reactor core and containment injection flow in the event that the recirculation capability is unavailable. The report considers several borated and non-borated sources for continued injection via the RWT.

RWT refill is not typically assumed in the safety analyses for LOCA recovery. However, St. Lucie SAMG's provide guidance to inject water into the RCS in the event that it is not possible to establish recirculation from the containment sump. These guidelines identify available water sources to refill the RWT. The borated water sources include the Spent Fuel Pool, Boric Acid Makeup Tanks and Volume Control Tank. The non-borated sources include the Primary Water Storage Tank, Treated Water Storage Tank and the Condensate Storage Tank. These guidelines also identify pumps available to provide water for RWT refill. These pumps include charging and fuel pool purification pumps for borated sources and fire pumps and treated water storage pumps for non-borated sources.

The current guidelines and procedures are considered to be acceptable, however, the St. Lucie EOPs will be enhanced to initiate refilling the RWT and identify potential sources of makeup to the RWT along with the identification of available pumps for RCS injection after recirculation actuation. Consistent with compensatory measure 1 above, St Lucie will complete the applicable EOP revisions to support implementation following the six-week operator continuing training cycle beginning November 10, 2003.

St. Lucie will continue to follow industry and WOG efforts in this area and if any additional recommendations are provided, they will be considered for implementation.

The proposed procedural and training enhancements and implementation schedule that address this compensatory measure provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**4. Containment Cleaning And Foreign Material Exclusion (FME)**

St. Lucie has implemented an aggressive containment cleanliness program to provide assurance that the containment buildings are free of foreign material and debris prior to entry into Mode 4 following shutdown and during power operation. Detailed containment cleanliness procedures exist for unit restart readiness and for containment entries at power. These procedures have been revised to incorporate the latest industry guidance concerning foreign materials contained within NEI 02-01, Revision 1, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments."

For unit restart following shutdowns, the containment is thoroughly inspected for loose debris and foreign material prior to start-up. A plant management team consisting of representatives from various departments performs walkdowns in at least two phases to assess containment material condition and overall housekeeping. Deficiencies are reported and corrected in a timely manner. Prior to Mode 4 entry, the containment is established as an FME area in accordance with plant procedures. A team consisting of a senior reactor operator and an FME supervisor perform a final walkdown of containment and develop a formal log of any non-permanent equipment, material, or tools for tracking purposes. Any items from this list that are to remain in containment during Mode 4 and above require formal evaluation by Engineering and subsequent review by the site Facility Review Group. Plant procedures also require that the Plant Manager and the Site Vice President perform a detailed walkdown of containment prior to Mode 4 at the end of each refueling outage to ensure plant readiness. This walkdown is a requirement contained within FPL Nuclear Division Policies. These procedures supplement the plant Technical Specification requirements for containment cleanliness to ensure all foreign material and debris is collected and removed from containment prior to start-up and that the containment recirculation sumps remain operable and capable of performing their intended design function during power operation.

An FME program has also been implemented at St. Lucie for at-power entries to ensure that all loose material entering containment is accounted for and removed as required. A dedicated procedure exists for at-power entries and includes specific instructions and signoffs to verify that visual inspections of affected areas have been performed and that these areas are free of loose debris or foreign material that could be transported to the containment recirculation sumps. Hand carried items taken into containment are also verified to be removed.

Finally, as documented in the response to NRC Generic Letter 98-04 (FPL letter L-98-277 dated November 4, 1998), St. Lucie has controls for the surface preparation, procurement, application, surveillance, and maintenance activities for Service Level 1 protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to St. Lucie Units 1 and 2. This program addresses both new coatings and ongoing maintenance coating activities.

The current Service Level 1 coating specification provides the technical requirements for protective coating work that is performed inside the St. Lucie Units 1 and 2 containment buildings. The coating specification provides the necessary technical information and controls to ensure that new coatings (a) are of a high quality, (b) meet licensing requirements, (c) minimize the potential for transport of paint debris to the containment sump under post-LOCA conditions, (d) provide corrosion protection, and (e) provide a suitable surface which will facilitate radioactive decontamination.

In accordance with the requirements of the Service Level 1 coating specification, logs of unqualified coatings in each unit are maintained by the Engineering department and documented in a controlled calculation. Engineering performs an inspection to document the condition of the coatings at the end of each refueling outage to update the logs as required. In addition, an Engineering assessment is performed of the in-place coatings prior to restart to ensure that they would not adversely affect the ECCS during a design basis accident.

With respect to containment cleaning and FME, St. Lucie will continue to follow on-going industry and WOG efforts in this area and if any additional recommendations are provided, they will be considered for implementation into the current plant program.

In summary, the current St. Lucie containment cleanliness program provides reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**5. Ensuring Containment Drainage Paths Are Unblocked**

Maintaining ECCS and CSS recirculation flowpaths within containment free from blockage is important to ensure proper sump operation. Flowpaths to the recirculation sump may include chokepoints, where the flowpath becomes so constricted that it could become blocked with debris following a high energy line break (HELB). As a result of debris blockage, substantial amounts of water required for adequate recirculation could be held up or diverted into containment volumes that do not drain to the recirculation sump.

With respect to containment drainage paths, the St. Lucie containment design has numerous openings in the internal shield walls separating the reactor vessel and RCS piping (source of the LOCA/resulting debris) from the outer containment leading to the sump. This design will accommodate local blockage of some radial flowpaths resulting in flow diversion from one opening to another, ultimately converging with the annular flowpaths to the sump. Collection of debris at these internal locations does not adversely impact overall sump water volume and has an added benefit to screen larger debris preventing transport to the sump screens. The upper floor levels of the Units 1 and 2 containments also contain large areas of grating that provide a substantial flowpath of containment spray water to the recirculation sump.

The containment recirculation flowpaths are walked down as part of the containment cleanliness inspection program described in Item 4 above. Temporary equipment is identified as part of those walkdowns and subsequently removed. Deck gratings and trench covers are verified to be installed and properly secured further ensuring recirculation flowpaths are maintained. Similarly, Engineering design controls are in place to evaluate permanent plant modifications

implemented within containment. Any equipment, structure, or component added to containment is appropriately evaluated for the potential to adversely block sump recirculation flowpaths.

To support future debris transport analyses to address the long term resolution of Generic Safety Issue (GSI) 191, St. Lucie will commit to performing Engineering walkdowns of the recirculation flowpaths of the Units 1 and 2 containments during the next refueling outages (Spring 2004 for Unit 1 and Fall 2004 for Unit 2). These walkdowns will be performed using the guidance provided in Section 5.2.4.2 of NEI 02-01. Any potential issues regarding containment recirculation flowpaths will be evaluated in accordance with the St. Lucie corrective action program.

The current and proposed compensatory measures to ensure containment flowpaths are unblocked provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**6. Ensuring Sump Screens Are Free Of Adverse Gaps And Breaches**

St. Lucie Technical Specifications (4.5.2.d.2 for Unit 1 and 4.5.2.e.2 for Unit 2) require visual inspections of the containment sumps at least once per 18 months for verification that the screens show no evidence of structural distress or corrosion. As documented in St. Lucie Unit 2 Licensee Event Report (LER) 50-389/1997-002 and the Reply to a Notice of Violation – NRC Integrated Inspection Report 97-09 (FPL letter L-97-216 dated September 4, 1997), St. Lucie has developed a detailed containment sump inspection procedure and inspection technique sheet to satisfy the requirements of the subject Technical Specifications. The procedure verifies the overall condition of the Units 1 and 2 containment sumps to ensure that design configuration is maintained. The procedure is implemented by appropriate maintenance and engineering personnel and qualified quality control inspectors. The procedure provides detailed guidance for the inspection of sump grating, screen panels, recirculation strainers (Unit 1), and sump penetrations. Sump components are inspected for signs of pitting, corrosion, abnormal wear, tears, gaps, physical damage, missing hardware, and any other irregularities. All sump inspection discrepancies are to be documented and dispositioned in accordance with the St. Lucie corrective action program. Since its implementation, the detailed sump inspection procedure has been effective in assuring that the containment sumps maintain their design configuration and are capable of performing their intended design function.

In summary, the existing St. Lucie Units 1 and 2 sump inspection procedure provides reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced. No further actions are deemed necessary in this area.

**Summary of St. Lucie Commitments In Response to Bulletin 2003-01**

- St. Lucie will enhance the applicable EOPs to provide the operators with more specific indications of sump blockage by utilizing all available instrumentation to identify symptoms of containment sump blockage or degraded ECCS pump performance. St. Lucie will complete the applicable EOP revisions to support implementation following the

six-week operator continuing training cycle beginning November 10, 2003. An information brief has been issued to the Operations staff as an interim measure.

- Informational training concerning NRC Bulletin 2003-01 will be provided to the technical support staff via the St. Lucie Engineering Training Program (ETP). This training, scheduled to be completed during the 4th quarter of 2003, will provide awareness of the significance of the sump clogging issues discussed in Bulletin 2003-01 and proposed compensatory measures to the engineering staff involved in supporting the TSC and EOF. A Training Bulletin has been issued to the Engineering staff as an interim measure.

- St. Lucie will enhance the applicable EOPs to initiate refilling the RWT from alternate water sources and identify available pumps for RCS injection after recirculation actuation. St. Lucie will complete the applicable EOP revisions to support implementation following the six-week operator continuing training cycle beginning November 10, 2003. An information brief has been issued to the Operations staff as an interim measure.

- To support future debris transport analyses to address the long term resolution of Generic Safety Issue (GSI) 191, St. Lucie commits to performing Engineering walkdowns of the recirculation flowpaths of the Units 1 and 2 containments during the next refueling outages (Spring 2004 for Unit 1 and Fall 2004 for Unit 2).

# ATTACHMENT 2

## Turkey Point Plant Response
## NRC Bulletin 2003-01

### Requested Information

This response addresses Option 2 of NRC Bulletin 2003-01. Option 2 requests that licensees describe any appropriate interim compensatory measures that have been or will be implemented to reduce the risk which may be associated with potentially degraded Emergency Core Cooling System (ECCS) and Containment Spray System (CSS) recirculation functions. Accordingly, this response describes the interim compensatory measures that have been implemented, plus those plant specific measures planned to be implemented with an associated implementation schedule.

This response is modeled after the Westinghouse Owners Group (WOG) template developed to assist licensees in preparing plant specific responses to NRC Bulletin 2003-01. It addresses those compensatory measures advocated by the NRC plus additional measures to be implemented at Turkey Point Units 3 and 4 in support of the bulletin objectives. Note that a description of Turkey Point Units 3 and 4 ECCS and CSS is provided in Sections 6.2 and 6.4 of the UFSAR.

**The following is the Turkey Point Units 3 and 4 response to the six (6) interim compensatory measures listed in the Discussion section of NRC Bulletin 2003-01:**

**1. Operator And Staff Training On Indications Of And Responses To Sump Clogging**

The Turkey Point Units 3 and 4 Emergency Operating Procedures (EOPs) are based on the generic Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERGs). In the event of a loss of coolant accident (LOCA), operators would enter the EOP network at E-0, "Reactor Trip or Safety Injection" in response to reactor trip and safety injection (SI) actuation associated with the Reactor Coolant System (RCS) leakage. After completing immediate and prompt actions, operators would diagnose the event and transition to E-1, "Loss of Reactor or Secondary Coolant."

While performing E-1, the operators would verify proper operation of the ECCS and CSS as these systems inject the contents of the refueling water storage tank (RWST) into the RCS and containment building. After approximately 15 minutes, the inventory in the RWST will decrease to 155,000 gallons, triggering a transition to ES-1.3, "Transfer to Cold Leg Recirculation." Performance of ES-1.3 results in realignment of the post accident heat removal systems to the recirculation-cooling mode.

Procedure ES-1.3 will be revised in response to the bulletin to verify that the ECCS and CSS pumps aligned in the recirculation-cooling mode are operating properly. If any of the pumps are indicating signs of distress, the operator will be instructed to stop the affected pumps and transition to ECA-1.1, "Loss of Emergency Coolant Recirculation." Turkey Point will implement the subject EOP revision following completion of operator continuing training on October 1, 2003.

Procedure ECA-1.1 provides contingency actions to mitigate the inability to establish recirculation-cooling and prolong RWST injection, to provide continued decay heat removal. The loss of recirculation capability due to sump blockage will be one entry into this existing procedure.

The operators are currently trained to recognize various signs of pump distress such as erratic behavior of electrical current draw and/or erratic fluctuations of indicated pump discharge flow. The following is a list of Turkey Point Units 3 and 4 plant-specific control room indications currently available to the operators to determine the potential of containment sump blockage:

- Containment recirculation sump level
- High Head Safety Injection (HHSI) header flow
- HHSI pump motor current
- HHSI header pressure
- HHSI pump low suction pressure annunciator
- HHSI pump motor overload annunciator
- Containment Spray (CS) pump motor overload annunciator
- Residual Heat Removal (RHR) pump flow
- RHR pump motor current
- RHR pump motor overload annunciator

Although the current training program does not specifically address the indications and responses to sump clogging, licensed operators are periodically challenged during requalification simulator evaluations with pump malfunctions. One such scenario occurs during a loss of decay heat removal event. In this scenario, RHR pump net positive suction head (NPSH) is eroded by the ingestion of air into the pump suction while the RCS is in a reduced inventory condition. The actions require correct diagnosis from the available instrumentation, correct action to secure the affected pump and correctly addressing the remaining system configuration. The symptoms and actions are similar to those that would be performed if the NPSH for the RHR pumps is eroded due to sump screen blockage during post-LOCA recirculation cooling.

In response to Bulletin 2003-01, a training brief will be issued to operations personnel to increase awareness of the potential for the containment recirculation sump to become clogged during operation of the ECCS and CSS pumps in the recirculation-cooling mode. The training brief will include a review of the indications of sump screen blockage, the control room instrumentation available to monitor sump screen blockage, and a synopsis of the EOP changes being made to address the bulletin concerns. This training brief will be issued by August 13, 2003. These topics will also be covered in operator requalification training starting August 18, 2003.

In order to inform the technical staff of those conditions that can impact sump screen performance, a presentation on the contents of NRC Bulletin 2003-01 will be made to personnel in the Engineering Training Program (ETP) during the 3rd quarter 2003 training cycle. This presentation will introduce the technical staff to the recent industry events dealing with containment recirculation sump screen clogging, the results of industry and NRC sponsored research on sump performance, and the types of foreign materials that can adversely affect sump screen performance if present in the post-LOCA debris field.

The proposed procedural and training enhancements to be implemented in response to this bulletin provide reasonable assurance that the risk associated with potentially degraded ECCS

and CSS recirculation functions has been effectively reduced. Turkey Point will continue to follow industry and WOG efforts in this area and if any additional recommendations are provided, they will be considered for implementation.

**2. Procedure Actions That Delay The Switchover To Containment Sump Recirculation**

The duration of the RWST injection phase can play a significant role in minimizing the potential for sump screen blockage once the ECCS and CSS are operating in the recirculation-cooling mode. Increasing the injection phase duration increases the amount of time that debris generated by the accident can settle to the bottom of the recirculation pool prior to the initiation of the recirculation-cooling mode. Debris that has settled has less potential for transport to the recirculation sump screens.

In Bulletin 2003-01, the NRC provides an example of a procedural modification that would delay the switchover to containment sump recirculation. This procedural change involves shutting down redundant pumps that are not necessary to provide required flows for core heat removal and containment temperature/pressure control.

To assess the merits of such a procedural modification for Turkey Point Units 3 and 4, the existing switchover sequence in procedures E-1 and ES-1.3 were evaluated to determine if any substantial increase in the duration of RWST injection could be achieved by such a change. The duration of the current injection phase for Turkey Point Units 3 and 4 varies between approximately 40-60 minutes depending on the number of ECCS and CSS trains that are in operation.

The response to item 1 above identified that procedure E-1 requires the operators to verify that at least one train of the ECCS and CSS are operating and injecting the contents of the RWST into the RCS and containment building. Under most SI actuation conditions, it is expected that both trains of ECCS and CSS will be operating for post-LOCA mitigation. Each ECCS train at Turkey Point Units 3 and 4 consists of a residual heat removal (RHR) pump and a high head safety injection (HHSI) pump. Each CSS train consists of a single CS pump and spray header. All of the ECCS and CSS pumps operate in parallel during the initial injection phase.

If both trains of ECCS and CSS are in operation, the inventory in the RWST will decrease to 155,000 gallons after approximately 15 minutes of injection, triggering a transition to ES-1.3. Performance of ES-1.3 results in realignment of the post accident heat removal systems to the recirculation-cooling mode. When the RWST inventory decreases to 155,000 gallons, the operating RHR pumps and one CS pump are stopped and the RHR pumps are aligned for recirculation from the containment sumps. The operating HHSI pumps and CS pump continue to inject the contents of the RWST into the RCS and the containment building until the RWST inventory decreases to 60,000 gallons. Once the RWST reaches 60,000 gallons, the HHSI and CSS pumps are aligned to the recirculation-cooling mode. Under large-break LOCA conditions, the ECCS and CSS will be aligned such that one RHR pump draws suction from the containment recirculation sumps and provides suction boost for one HHSI pump and one CS pump. The HHSI pump provides core decay heat removal via RCS cold leg injection. The CS pump provides containment heat removal.

The effects of stopping a redundant CS pump and one redundant RHR pump earlier in the event to extend the injection phase (i.e. less than 10 minutes into the event) were evaluated. The additional action to stop redundant RHR and CS pumps would only extend the injection phase by a minimal amount (approximately five minutes). When weighed against the inherent drawbacks of an additional operator action, it was concluded that there was no clear decrease in risk associated with such a brief extension of the injection phase.

Any pre-emptive operator actions to stop pumps or throttle flow earlier than that considered above are not recommended until the impact of such changes can be evaluated on a generic basis for the following reasons:

- Operator actions to stop ECCS or CSS pumps or throttle flow result in conditions that are outside the design basis assumptions, such as single failure, which can create conditions that would make the optimal recovery more challenging.

- The most effective means to substantially increase injection duration and delay the switchover to containment sump recirculation requires the operators to stop ECCS or CSS pumps in the first few minutes of an accident (i.e. less than 10 minutes). Such changes would introduce a significant opportunity for operator error based on other actions that may be required during that time period. Any new operator actions to stop additional ECCS or CSS pumps during the injection phase could result in increased risk due to operator error, and are not recommended.

For recovery from a small-break or medium-break LOCA, the operators would transition from E-0 to E-1 as described above for a large-break LOCA based on indications that there is a breach in the RCS pressure boundary. The operator will transition from E-1 to ES-1.2, "Post LOCA Cooldown and Depressurization", if RCS pressure remains above the RHR pump shutoff pressure, or continue in E-1 if RCS pressure is below the RHR pump shutoff pressure (larger breaches). If the breach in the RCS pressure boundary is small enough, it is possible to cool down and depressurize the RCS to cold shutdown conditions using ES-1.2 without draining the RWST to the switchover level. Cold leg recirculation would not be required to be established and containment sump blockage would not be a concern under these conditions.

In summary, no changes to increase injection time are recommended at this time. Any generic changes to the WOG ERGs concerning isolation of a redundant operating ECCS and/or CSS train during the injection phase of a LOCA will be evaluated under the formal ERG maintenance program. After any generic guidance is approved and issued, Turkey Point Units 3 and 4 will evaluate incorporating the recommended guidance into plant operating documents and provide the required operator training.

**3. Alternate Sources To Refill The RWST Or To Inject Into The Reactor Coolant System**

Procedure ECA-1.1 provides contingency actions to mitigate the inability to establish recirculation-cooling by prolonging RWST injection for continued decay heat removal. ECA-1.1 will be enhanced in response to NRC Bulletin 2003-01 to provide additional injection sources by aligning the opposite unit's RWST and HHSI pumps to inject upon a loss of the recirculation-cooling due to recirculation sump blockage. The cross-connect alignment is performed by the operator opening two motor-operated valves from the control room and instructing the opposite unit's reactor

operator to start a HHSI pump. Additionally, ECA-1.1 will be modified to have operators throttle flow from the opposite unit's RWST to match decay heat requirements, further increasing the amount of available injection time. Turkey Point will implement the subject EOP revisions following completion of operator continuing training on October 1, 2003.

If the opposite unit's RWST is not available (e.g. the other unit is in a refueling outage), ECA-1.1 will direct the operators to align charging pumps to inject from the accident unit's RWST. Since the charging pumps are positive displacement pumps, and therefore have minimal NPSH requirements, the charging pumps can draw suction from the RWST when it would not provide adequate NPSH for the centrifugal ECCS and CSS pumps. By aligning the charging pumps to the accident unit's RWST, an additional 40,000 gallons of injection capacity is available for core cooling. Turkey Point will implement the subject EOP revision following completion of operator continuing training on October 1, 2003.

Procedure ECA-1.1 will also be revised to align makeup to the accident unit's RWST via the normal boric acid makeup system whenever the unit enters one of the above alignments. This will provide additional RWST volume for continued RCS injection and containment spray flow. Turkey Point will similarly implement this EOP revision following completion of operator continuing training on October 1, 2003.

The procedures will be structured to terminate the additional injection upon reaching the analyzed submergence level inside containment when additional injection is provided as described above. This allows the procedures to be modified to provide additional injection without compromising any EQ equipment inside of containment. Depending on the water level at which alternate injection paths are started (either opposite unit's RWST or accident unit's charging pumps) approximately 3 hours of additional injection time can be achieved.

The alternate injection schemes described above do not permit continued use of the CSS. There is currently no other proceduralized alternate water sources for containment spray. However, procedure ECA-1.1 currently recognizes that the available inventory for RCS injection and CSS operation must be conserved and takes credit for the redundant heat removal capability of the emergency containment coolers to provide the necessary containment pressure control function. Operation of two of the three installed emergency containment coolers is permitted, in lieu of the CSS, if containment pressure is between 55 psig (the design pressure) and 14 psig.

The proposed procedural enhancements to provide additional injection from alternate water sources in response to this bulletin provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions has been effectively reduced. Turkey Point Units 3 and 4 will continue to follow industry and WOG efforts in this area and if any additional recommendations are provided, they will be considered for implementation.

**4. Containment Cleaning And Foreign Material Exclusion (FME)**

Turkey Point Units 3 and 4 have an aggressive containment cleanliness program that ensures the containment buildings are free of foreign material and debris prior to entry into Mode 4, following shutdown, and during power operation. Detailed containment cleanliness procedures exist for unit restart readiness and for containment entries at power. These procedures will be

revised in response to NRC Bulletin 2003-01 to incorporate the latest industry guidance concerning foreign materials contained within NEI 02-01, Revision 1, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments" prior to the next refueling outage (October 2003).

Foreign Material Exclusion (FME) control around the recirculation sumps is established by the General Operating Procedure (GOP) that transitions the unit from hot standby to cold shutdown conditions. This procedure requires that no work be permitted in the vicinity of the recirculation sumps without FME controls in place or having FME covers installed over the sump screen enclosures. There is also a hold point in the GOP to ensure that appropriate FME controls are in place prior to authorizing maintenance activities inside containment. The FME covers prevent debris which may be generated during a unit shutdown from damaging or penetrating the screens. The covers also protect the screens from damage due to incidental contact with work materials that may be staged near the recirculation sumps.

Containment cleanliness during shutdowns is maintained by the containment closeout inspection. The inspection verifies that no loose debris remains inside containment that could be transported to the recirculation sumps during an accident. The closeout procedure specifically identifies those items that could adversely affect sump screen performance if left inside containment. Although this list is comprehensive, it does not currently include guidance provided by NEI 02-01. As described above, a planned compensatory measure provides guidance from NEI 02-01 to the Turkey Point Units 3 and 4 containment closeout procedure.

The containment is thoroughly inspected (under the containment closeout procedure) for loose debris and foreign material prior to a unit start-up. A team consisting of representatives from various departments perform walkdowns to assess containment material condition and overall housekeeping. Deficiencies are reported and corrected in a timely manner. Any items that are to remain in containment during operation in Mode 4 and above require formal evaluation and subsequent review by the site Plant Nuclear Safety Committee. The FPL Nuclear Division Policies also require that the Plant General Manager and the Site Vice President perform a detailed walkdown of containment prior to Mode 4 at the end of each refueling outage, and at the end of a mid-cycle outage where work is performed inside containment, to ensure plant readiness. These procedures collectively ensure that all foreign material and debris is collected and removed from containment prior to start-up and that the containment recirculation sumps remain operable and capable of performing their intended design function during power operation.

Special FME controls are in place via administrative procedure for containment entries when containment integrity is established. This procedure requires that all materials and tools taken into containment be logged and removed upon exit. Cleanliness inspections of the affected areas inside containment are to be completed daily to verify that no loose debris is present which could be transported to the containment recirculation sumps during LOCA conditions. The containment entry administrative procedure also restricts work around the recirculation sumps until adequate controls are in place to prevent screen damage or blockage, (e.g. installation of FME covers). All personnel making containment entries under the administrative procedure are required to receive a 'standard brief'. This briefing specifically discusses FME concerns with respect to blocking of the recirculation sumps.

The Turkey Point Units 3 and 4 response to NRC Generic Letter 98-04 (FPL letter L-98-272, dated November 9, 1998) documented the controls for the surface preparation, procurement, application, surveillance, and maintenance activities associated with Service Level 1 protective coatings used inside the containment. These controls ensure that the Service Level 1 protective coatings will perform in a manner that is consistent with the licensing basis and regulatory requirements applicable to Turkey Point Units 3 and 4. This program addresses both new coatings and ongoing maintenance coating activities.

The current Turkey Point Unit 3 and 4 Service Level 1 coating specification provides the technical requirements for protective coating work that is performed inside the containment buildings. The coating specification provides necessary technical information and controls to ensure that new coatings (a) are of a high quality, (b) meet licensing requirements, (c) minimize the potential for transport of paint debris to the containment sump under post-LOCA conditions, (d) provide corrosion protection, and (e) provide a suitable surface that will facilitate radioactive decontamination.

The Service Level 1 coating specification requires that logs of unqualified coatings in each unit be maintained by the Engineering department and documented in a controlled calculation. Inspections to document the condition of the coatings are performed at the end of each refueling outage to update the logs as required. An Engineering assessment is performed of the in-place coatings prior to restart to ensure that they would not adversely affect the recirculation-cooling function following a LOCA.

A continuing effort to reduce and minimize the amount of unqualified coatings inside the containment buildings is a high priority objective of the Turkey Point Units 3 and 4 containment coating program. Prior to every refueling outage a prioritized listing of Service Level I coatings tasks to be worked during the outage is prepared. At the beginning of each outage a walkdown of containment coatings is performed and emergent items are added to the existing list and prioritized against the planned outage scope.

Turkey Point Units 3 and 4 will continue to follow on-going industry and WOG efforts with respect to containment cleaning and FME. Additional industry recommendations will be considered for implementation into the current plant program.

In summary, the proposed enhancements to the containment cleanliness program will provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete. The upgrades to the procedures as described above will be completed prior to the next Turkey Point refueling outage (October 2003). This schedule is considered adequate since these procedures are not utilized until the end of a refueling outage.

**5. Ensuring Containment Drainage Paths Are Unblocked**

Maintaining ECCS and CSS recirculation flowpaths within containment free from blockage is important to ensure proper sump operation. NRC Bulletin 2003-01 cautions that flowpaths to the recirculation sump could potentially include chokepoints, where the flowpath becomes so constricted that it could become blocked with debris following a postulated RCS pipe break. As a result of debris blockage, substantial amounts of water required for adequate recirculation

could be held up or diverted into containment volumes that do not drain to the recirculation sump.

The Turkey Point Units 3 and 4 containment design has numerous openings in the biological shield wall separating the RCS piping (source of the LOCA/resulting debris) from the outer containment annulus leading to the sump. Localized blockage of these flowpaths would result in flow diversion from one opening to another, which would still provide adequate flowpaths to the sump. Collection of debris at these internal locations does not adversely impact overall sump water volume and has an added benefit of screening some debris from being transported to the sump screens.

The Turkey Point Units 3 and 4 containment buildings have very few areas that could be blocked by debris and become collection points. One location of particular concern is the reactor refueling cavity. In order to prevent the reactor refueling cavity from filling with water post accident (i.e. diverting water from the recirculation sump), the cavity is equipped with drain valves that allow the cavity to continuously discharge to the recirculation sumps. Currently, these valves are verified to be locked open at several points during the course of an outage. Following draining and decontamination of the reactor refueling cavity, the cavity drain valves are locked open. As a preparation for filling of the RCS, the cavity drain valves are again inspected to verify that they are in the locked open position. Finally, the GOP that takes the plant from Mode 5 to Mode 3 requires verification that the drain valves are in the locked open position. Verifying that this flow path is open at various points in the restart process provides defense in depth against diverting water from the recirculation sumps.

Another potential contributor to blockage of recirculation drain paths is equipment/materials that are left in containment following an outage. Equipment that is to be left inside containment above Mode 4 is evaluated for its impact on the recirculation sumps. The containment closeout inspection subsequently verifies that the equipment is stowed in accordance with the requirements of the evaluation. This prevents any equipment being left inside containment from impacting the drainage flow paths to the recirculation sumps. Similarly, design controls are in place to evaluate permanent plant modifications implemented within containment. Any equipment, structure, or component added to containment with the potential to adversely block sump recirculation flowpaths is appropriately evaluated.

Turkey Point Units 3 and 4 will commit to perform supplemental walkdowns of the containment recirculation flowpaths during the next refueling outage for each unit (Cycle 21 refueling outages). Potential issues regarding containment recirculation flowpaths will be evaluated in accordance with the Turkey Point Units 3 and 4 corrective action program.

**6. Ensuring Recirculation Sump Screens Are Free Of Adverse Gaps And Breaches**

Turkey Point Units 3 and 4 Technical Specifications (4.5.2.e.3) require visual inspections of the containment sumps at least once per 18 months for verification that the screens show no evidence of structural distress or abnormal corrosion. The recirculation sump screens in the containment buildings are inspected at the end of each refueling outage to ensure that they will be able to perform their intended filtration function during a postulated accident. The inspection verifies that:

a) the inlets of the ECCS/CSS suction lines are not restricted,

b) the screen components are present and properly installed to preclude bypass flow,

c) there are no signs of structural distress or abnormal corrosion that could compromise screen integrity, and

d) there are no gaps or breaches in the screens, or between the screen enclosures and the containment floor, that could adversely affect the filtration function.

Maintenance performs this inspection using a go-no-go gauge that matches the design filtration requirement of the sump screens. Any portion of the sump screen, which appears to be out of the allowable limits is documented and repaired as part of the inspection.

A review of the current sump inspection procedure as written indicates that it is responsive to the bulletin concerns; however, some minor modifications to the inspection procedure are recommended. The procedure will be updated in response to NRC Bulletin 2003-01 to provide more detail in the inspection requirements, such as, inspection of the sump frame bolting and the condition of any existing screen patchwork. Engineering will also support the sump screen inspection during the upcoming refueling outage for each unit to validate that the procedure is being implemented properly in the field. Any deficiencies identified during the recirculation sump inspection will be evaluated in accordance with the Turkey Point Units 3 and 4 corrective action program.

In summary, the Turkey Point Units 3 and 4 sump screen inspections and proposed procedure enhancements provide reasonable assurance that the risk associated with potentially degraded ECCS and CSS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**Summary of Turkey Point Units 3 and 4 Commitments In Response to Bulletin 2003-01**

- Procedure ES-1.3 will be revised in response to NRC Bulletin 2003-01 to verify that the ECCS and CSS pumps aligned to the recirculation-cooling mode are operating properly, and provide instruction to stop any affected pumps and transition to ECA-1.1. Turkey Point will implement the subject EOP revision following completion of operator continuing training on October 1, 2003.

- In response to Bulletin 2003-01, a training brief will be issued to operations personnel to increase awareness of the potential for the containment recirculation sump to become clogged during operation of the ECCS and CSS pumps in the recirculation-cooling mode. This brief will be issued by August 13, 2003.

- Incorporate recirculation sump blockage indicators and recovery actions into operator requalification training. This change will be completed by August 18, 2003.

- A presentation on the contents of NRC Bulletin 2003-01 will be made to personnel in the Engineering Training Program (ETP) during the next training cycle that is scheduled for August 2003.

- Procedure ECA-1.1 will be enhanced in response to NRC Bulletin 2003-01 to provide additional injection sources by aligning the opposite unit's RWST and HHSI pumps or accident unit's charging pumps to inject upon a loss of recirculation cooling, and throttle flow to match decay heat. Turkey Point will implement the subject EOP revisions following completion of operator continuing training on October 1, 2003.

- Plant cleanliness procedures will be revised in response to NRC Bulletin 2003-01 to incorporate guidance from NEI 02-01, Revision 1 "Condition Assessment Guidelines: Debris Sources Inside PWR Containments." These changes will be completed by October 1, 2003.

- Perform walkdowns of the containment recirculation flowpaths during the Unit 3 and 4 Cycle 21 refueling outages. These outages are currently scheduled for Fall 2004, and Fall 2003 respectively.

- Revise the recirculation sump inspection procedure to provide more detail in the inspection requirements. This change will be completed by October 1, 2003.

- Engineering will support the sump screen inspections during the next refueling outage for each unit to validate that the inspection procedure is being implemented properly in the field. These outages are currently scheduled for Fall 2003, and Fall 2004.

# ATTACHMENT 3

## FPL Energy Seabrook Response
## NRC Bulletin 2003-01

**Requested Information**

This response addresses Option 2 of the Requested Information in NRC Bulletin 2003-01. Option 2 requests that licensees describe any appropriate interim compensatory measures that have been or will be implemented to reduce the risk which may be associated with potentially degraded Emergency Core Cooling System (ECCS) and Containment Building Spray System (CBS) recirculation functions while evaluations to determine compliance proceed. Accordingly, this response describes the interim compensatory measures that have been implemented as well as plant specific measures planned to be implemented with an associated implementation schedule.

This response is modeled after the Westinghouse Owners Group template developed to assist licensees in preparing plant specific responses to NRC Bulletin 2003-01. Note that a description of the Seabrook Station ECCS and CBS is provided in Section 6.3 and Section 6.2.2 of the UFSAR, respectively.

**The following is the FPL Energy Seabrook response to the six (6) interim compensatory measures listed in the Discussion section of NRC Bulletin 2003-01:**

**1. Operator And Staff Training On Indications Of And Responses To Sump Clogging**

The Seabrook Station Emergency Operating Procedures (EOPs) are based on the generic Westinghouse Owners Group (WOG) Emergency Response Guidelines (ERGs). In the event of a LOCA, operators would enter the EOP network at E-0, "Reactor Trip or Safety Injection" in response to reactor trip and safety injection (SI) actuation associated with the reactor coolant system (RCS) leakage. After completing immediate and prompt actions, operators would diagnose the event and transition to E-1, "Loss of Reactor or Secondary Coolant." While performing E-1, the operators would verify proper operation of the ECCS and CBS as they inject the contents of the refueling water storage tank (RWST) into the RCS and containment building. After the RWST decreases to approximately 115,000 gallons, a transition is made to ES-1.3, "Transfer to Cold Leg Recirculation." Performance of ES-1.3 results in realignment of the post accident heat removal systems to the recirculation-cooling mode.

The current Seabrook Station EOPs and operator training include the monitoring of operating ECCS and CBS pumps for indications of pump distress or loss of net positive suction head (NPSH), including erratic current, flow, discharge pressure, suction pressure (CBS pumps only), and bearing temperature. Specifically, operator guidance for continuously monitoring pump parameters is already provided in Attachment A to procedure E-1. The operators are thoroughly trained on scenarios that include the use of E-1, including the use of Attachment A for monitoring ECCS and CBS pump performance.

The following is a list of Seabrook Station plant-specific control room indications currently available to the operators to determine the potential of containment sump blockage:

- RHR (low-head SI) pump flow
- RHR (low-head SI) pump motor current
- RHR (low-head SI) pump discharge pressure
- RHR (low-head SI) pump bearing temperature
- Containment Building Spray (CBS) pump motor current
- Containment Building Spray (CBS) pump discharge pressure
- Containment Building Spray (CBS) pump suction pressure
- Containment Building Spray (CBS) pump bearing temperature
- Charging (high-head SI) pump flow
- Charging (high-head SI) pump motor current
- Charging (high-head SI) pump discharge pressure
- Charging (high-head SI) pump bearing temperature
- SI (intermediate-head SI) pump flow
- SI (intermediate-head SI) pump motor current
- SI (intermediate-head SI) pump discharge pressure
- SI (intermediate-head SI) pump bearing temperature
- Containment building level

As stated above, procedure E-1 already contains operator guidance to continuously monitor pump parameters to determine if the pumps are in distress. Similar guidance will be added to ES-1.3, "Transfer to Cold Leg Recirculation," following the switchover to the sumps, to monitor pump conditions. With the exception of the containment building level indication, observation of the above parameters will be included in ES-1.3. Because the location of the containment building level detector is outside of the sump screens, this parameter provides only an indirect indication of screen blockage. If the containment building level indication is as expected and ECCS and CBS pump parameters indicate pump distress, this could be indicative of screen blockage. Since operator response would be the same regardless of diagnosis, it is not deemed necessary to proceduralize containment building level indication as a parameter to be monitored. FPL Energy Seabrook will complete the above changes to ES-1.3 for implementation following the six-week duration operator training cycle starting August 18, 2003. This implementation schedule is based on the time needed to complete the review, verification, and training processes required for EOPs.

Considering recent industry experience and anticipation of NRC actions to develop a generic letter regarding PWR sump performance, licensed operators at Seabrook Station have received awareness training on the issue of the potential for sump screen blockage. This training provides a foundation for the training to be completed on the proposed EOP procedural enhancements.

As an enhancement to the compensatory measure for operator training depicted in the bulletin, a presentation of the contents of NRC Bulletin 2003-01 will also be made to Engineering support personnel during the fourth quarter of 2003. This presentation will be designed to introduce Engineering support personnel of the recent industry events dealing with containment recirculation sump screen clogging, results of industry and NRC sponsored research on sump performance,

and the types of substances that can adversely affect sump screen performance if present in the post-LOCA debris field. This training will provide awareness of the significance of potential sump clogging for the Engineering support personnel involved in supporting the Technical Support Center and Emergency Offsite Facility.

FPL Energy Seabrook continues to follow industry and WOG efforts in this area and if any additional procedural or training recommendations are provided, they will be evaluated and considered for implementation.

The proposed procedural and training enhancements and implementation schedule regarding indications of sump clogging and informational training to Engineering support personnel provide reasonable assurance that the risk associated with potentially degraded ECCS and CBS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**2. Procedure Actions That Delay The Switchover To Containment Sump Recirculation**

In Bulletin 2003-01, the NRC provides an example of a procedural modification that would delay the switchover to containment sump recirculation. This procedural change involves shutting down redundant pumps that are not necessary to provide required flows for core heat removal and containment building cooling/depressurization/iodine removal.

For larger LOCAs that require ECCS injection flow and CBS spray, pre-emptive operator actions to stop pumps or throttle flow solely for the purpose of delaying switchover to containment sump recirculation are not recommended until the impact of the changes can be evaluated on a generic basis for the following reasons:

- Operator actions to stop ECCS or CBS pumps or throttle flow result in conditions that are outside of the current Seabrook Station design basis safety analysis assumptions, such as single failure. This would result in the potential for creating conditions that would make the optimal recovery more challenging (e.g., stopping containment building spray impacts containment fission product removal, containment sump pH and equipment environment qualification design basis requirements).

- These actions are inconsistent with the overall WOG ERG philosophy. The WOG ERGs are symptom-based procedures that provide for the monitoring of plant parameters and prescribe actions based on the response of those parameters. To avoid the risk of taking an incorrect action for an actual event, the WOG ERGs do not prescribe contingency actions until symptoms that warrant those contingency actions are identified.

- These actions are inconsistent with the current operator response using the WOG ERGs that have been established through extensive operator training. The expected operator response is based on the optimal set of actions considering both design basis accidents and accidents outside the design basis. The WOG ERG operator response is not limited to a specific accident progression in order to provide optimal guidance for a wide range of possible accidents.

- To be effective in delaying the switchover to containment sump recirculation, operator actions to stop ECCS or CBS pumps must be taken in the first few minutes of an accident. This introduces a significant opportunity for operator errors based on other actions that may be required during this time frame. Any new operator actions to stop ECCS or CBS pumps could result in increased risk due to operator error.

For small to medium LOCAs, guidance to delay depletion of the RWST before switchover to sump recirculation currently exists in procedure ES-1.2, "Post LOCA Cooldown and Depressurization." This procedure provides actions to cooldown and depressurize the RCS to reduce the break flow, thereby reducing the injection flow necessary to maintain RCS subcooling and inventory. The operating ECCS pumps are sequentially stopped to reduce injection flow, based on pre-established criteria that maintain core cooling, resulting in less outflow from the RWST. For smaller LOCAs, it is possible to cooldown and depressurize the RCS to cold shutdown conditions before the RWST is drained to the switchover level. Therefore cold leg recirculation is not required to be established, and sump blockage is not an issue.

In summary, no changes to increase injection time are recommended at this time. Any generic changes to the WOG ERGs regarding the delay of switchover to containment sump recirculation as a compensatory measure for potentially degraded ECCS and CBS recirculation functions will be evaluated as part of a WOG program. FPL Energy Seabrook will continue to follow industry and WOG efforts in this area, and if any recommendations are provided, they will be evaluated and considered for implementation.

**3. Alternate Sources To Refill The RWST Or To Inject Into The Reactor Coolant System**

Los Alamos National Laboratory technical report LA-UR-02-7562, "The Impact of Recovery from Debris-Induced Loss of ECCS Recirculation on PWR Core Damage Frequency", identifies that operator action to refill the RWST after injection provides the potential to reestablish reactor core and containment injection flow in the event that the recirculation capability is unavailable. The report considers several borated and non-borated sources for continued injection via the RWST.

RWST refill is not typically assumed in the safety analyses and plant design bases, and introduces the potential for containment flooding and the loss of instrumentation and equipment inside containment.

However, Seabrook Station procedure ECA-1.1, "Loss of Emergency Coolant Recirculation," currently addresses RWST refill, once it is determined that there is a loss of recirculation capability. The makeup source currently specified for RWST refill is the chemical and volume control system (CVCS) blended makeup. Although subsequent lineup of the blended makeup to the volume control tank (VCT) and to the charging pump for injection is specified in procedure ECA-1.1, it does not currently address realignment of pumps for injection from the RWST.

A realignment of the charging (high head SI) pumps to the RWST effectively provides an additional source of borated water from the unused capacity remaining in the RWST. The current switchover level from the RWST to the containment recirculation sumps is based on the potential for vortexing in the RWST with operation of all of the ECCS pumps through the spray additive tank mixing chamber. The charging pumps take suction from the RWST through separate

lines, allowing them to be used for injection of additional unused RWST capacity, in the event of loss of recirculation. This lineup effectively provides an additional source of water in the RWST (approximately 30,000 to 70,000 gallons, depending on the time it takes the operators to complete the RWST switchover), plus the blended refill makeup that is in progress. Based on this, Procedure ECA-1.1 will be revised to realign the charging pump(s) back to the RWST for injection. In addition, a step will be included to adjust the injection rate to meet the core decay heat rate, by throttling the charging pump motor-operated discharge valves. Once the RWST has reached a level where charging pump(s) can no longer take suction from the RWST, the current methodology provided in procedure ECA-1.1 will be used to align the VCT for makeup via the CVCS blended makeup system.

FPL Energy Seabrook will complete the above proposed changes to ECA-1.1 for implementation following the six-week duration operator training cycle starting August 18, 2003. This implementation schedule is based on the time needed to complete the review, verification, and training processes required for EOPs.

FPL Energy Seabrook will also continue to follow industry and WOG efforts in this area and if any additional recommendations are provided, they will be evaluated and considered for implementation.

The proposed procedural and training enhancements and implementation schedule that address alternate sources to refill the RWST and inject into the RCS provide reasonable assurance that the risk associated with potentially degraded ECCS and CBS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**4. Containment Cleaning And Foreign Material Exclusion (FME)**

FPL Energy Seabrook currently has an aggressive containment cleanliness program that provides assurance that the containment building is free of foreign material and debris prior to entry into Mode 4 following shutdown and during power operation. The FPL Energy Seabrook containment coordinators are in charge of housecleaning efforts, which include vacuuming, mopping, etc. The charter for a management team addressing containment issues for the upcoming refueling outage (October 2003) provides the plan for cleaning/housekeeping. This plan has also been used for the last several refueling outages. The charter provides guidelines for (a) the containment crews to concentrate on housekeeping and general cleanliness tasks when not otherwise occupied, (b) the use of station staff volunteers to assist in cleaning efforts, and (c) a walkdown one shift prior to the official closeout procedure implementation. This walkdown crew is comprised of high level management and includes identification of areas that need further attention prior to closeout.

Detailed containment closeout procedures exist for unit restart readiness and for containment entries at power. For unit restart following shutdowns, the containment is thoroughly inspected (under the containment closeout procedure) for loose debris and foreign material prior to start-up. A plant management team consisting of representatives from various departments perform walkdowns to assess containment material condition and overall housekeeping. Deficiencies are reported and corrected in a timely manner. Any temporary scaffolding or equipment that is to remain in containment during Mode 4 and above requires formal evaluation by Engineering.

For containment entries when containment integrity is established, a visual inspection of the affected areas for loose debris, which could be transported to the containment sumps, is made. Each work group supervisor completes an inspection, prior to closeout. The containment entry procedure also requires that any tools/equipment left in the containment be seismically secured. This would prevent transport of such items to the sumps. When making a containment entry while containment integrity is established, a 'standard brief' is procedurally required, which includes discussion of the above issues.

Finally, as documented in the response to NRC Generic Letter 98-04 (North Atlantic Letter NYN-98125 dated November 6, 1998), FPL Energy Seabrook has controls for the surface preparation, procurement, application, surveillance, and maintenance activities for Service Level 1 protective coatings used inside the containment in a manner that is consistent with the licensing basis and regulatory requirements applicable to Seabrook Station. This program addresses both new coatings and ongoing maintenance coating activities.

The current Service Level 1 coating specification and procedure provide the technical requirements for protective coating work that is performed inside the Seabrook Station containment building. The coating specification provides necessary technical information and controls to ensure that new coatings (a) are of a high quality, (b) meet licensing requirements, (c) minimize the potential for transport of paint debris to the containment sumps under post-LOCA conditions, (d) provide corrosion protection, and (e) provide a suitable surface which will facilitate radioactive decontamination.

A log of unqualified coatings is maintained by Design Engineering and is documented in a controlled calculation. Seabrook Station periodically conducts condition assessments of Service Level 1 coatings inside the containment building, as part of the 10CFR50.65 Maintenance Rule inspections of the structure. Efforts to reduce and minimize the amount of unqualified coatings inside the containment building are a high priority objective of the Seabrook Station containment coating program. Seabrook Station prepares a prioritized listing of Service Level I coatings tasks to be worked during refueling outages.

The above procedures and practices have been reviewed against the latest industry guidance concerning foreign materials contained within NEI 02-01, Revision 1, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments." The review concluded that existing procedures and practices meet the intent of these industry initiatives, and no procedural changes are required.

With respect to containment cleaning and FME, FPL Energy Seabrook will continue to follow on-going industry and WOG efforts in this area and if any additional recommendations are provided, they will be evaluated and considered for implementation into the current plant program.

In summary, the current Seabrook Station containment building cleanliness program provides reasonable assurance that the risk associated with potentially degraded ECCS and CBS recirculation functions is effectively reduced until evaluations to determine compliance are complete. No further actions are deemed necessary in this area.

## 5. Ensuring Containment Drainage Paths Are Unblocked

Maintaining ECCS and CBS recirculation flowpaths within containment free from blockage is important to ensure proper sump operation. Flowpaths to the recirculation sumps may include chokepoints, where the flowpath becomes so constricted that it could become blocked with debris following a high energy line break (HELB). As a result of debris blockage, substantial amounts of water required for adequate recirculation could be held up or diverted into containment volumes that do not drain to the recirculation sumps.

With respect to containment drainage paths, the Seabrook Station containment design has numerous openings in the bioshield, separating the reactor vessel and RCS piping (source of the LOCA/resulting debris) from the outer containment annulus leading to the sumps. This design will accommodate local blockage of some radial flowpaths resulting in flow diversion from one opening to another, ultimately converging with the annular flowpaths to the sumps. Collection of debris at these internal locations does not adversely affect overall sump water volume and has an added benefit to screen larger debris from being transported to the sump screens. The upper floor levels of the containment building also contain large stairwell openings that provide a substantial flowpath of containment building spray water to the recirculation sumps.

Based on the design of Seabrook Station's containment, there are very few areas that could be blocked and become collection points. One location, which can potentially become a collection point is the refueling cavity. In order to prevent the refueling cavity from filling with water post accident, it is equipped with drain valves, which allow the cavity to discharge to the recirculation sumps. Seabrook Station's containment closeout inspection verifies that this drainage flow path from the refueling cavity to the recirculation sumps is available prior to unit restart.

Another potential contributor to blockage of recirculation drain paths is equipment/materials that are left in containment following an outage. Any equipment that is to be left inside containment is evaluated by Engineering, including its impact on sump performance functions. This prevents any equipment being left inside containment from impacting the drainage flow paths to the recirculation sumps. Engineering design controls are in place to evaluate permanent plant modifications implemented within containment. Any equipment, structure, or component added to the containment is appropriately evaluated for the potential to adversely block sump recirculation flowpaths.

To support future debris transport analyses performed to address the long term resolution of Generic Safety Issue-191, FPL Energy Seabrook will perform a walkdown of the recirculation flowpaths within the containment building during the upcoming refueling outage (October, 2003), utilizing the guidance provided within Section 5.2.4.2 of NEI 02-01, Revision 1, "Condition Assessment Guidelines: Debris Sources Inside PWR Containments," dated September 2002. This implementation schedule is based on the need for entry into portions of the containment building that are inaccessible during power operation. Any potential issues identified during the walkdown will be evaluated in accordance with the Seabrook Station corrective action program.

The proposed compensatory measures to ensure containment flowpaths are unblocked provide reasonable assurance that the risk associated with potentially degraded ECCS and CBS

recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**6. Ensuring Sump Screens Are Free Of Adverse Gaps And Breaches**

Seabrook Station Technical Specification 4.5.2.d.2 requires visual inspections of the containment sumps at least once per 18 months for verification that the screens show no evidence of structural distress or abnormal corrosion. The associated Seabrook Station procedure verifies the overall condition of the containment sumps to ensure that the design configuration is maintained. The procedure is implemented by appropriate Operations and Engineering personnel. The procedure provides guidance for the inspection of sump screens, trash racks, the sump inlet and the sump compartments themselves.

A review of the work history has demonstrated that repairs have been made to address flaws in the screen mesh. The current sump inspection procedure as written and conducted is responsive to the bulletin concerns; however some minor modifications to the inspection procedure are recommended. The procedure will be enhanced to include more details in the acceptance criteria for inspections. Additionally, the procedure will require that, if discrepancies are identified, they are to be dispositioned in accordance with the Seabrook Station corrective action program. These procedure revisions will be completed prior to the upcoming outage (October 2003), which is the next scheduled performance of this inspection. An earlier inspection is not practical, based on the need to take significant amount of time in the containment building, which is a high temperature/radiation area.

In summary, the existing and planned enhancements to the Seabrook Station sump inspection procedure provides reasonable assurance that the risk associated with potentially degraded ECCS and CBS recirculation functions is effectively reduced until evaluations to determine compliance are complete.

**Summary of FPL Energy Seabrook Commitments In Response to Bulletin 2003-01**

- FPL Energy Seabrook proposes to enhance procedure ES-1.3, "Transfer to Cold Leg Recirculation," to add a step to monitor ECCS and CBS pump conditions, using all available control room indications applicable to pump performance. FPL Energy Seabrook will complete these changes to ES-1.3 for implementation following the six-week duration operator training cycle starting August 18, 2003.

- A presentation on the contents of NRC Bulletin 2003-01 will be made to Engineering support personnel during the fourth quarter of 2003. This training will provide awareness of the significance of sump clogging issues for the engineering staff involved in supporting the Technical Support Center (TSC) and Emergency Offsite Facility (EOF).

- FPL Energy Seabrook proposes to enhance procedure ECA-1.1, "Loss of Emergency Coolant Recirculation," to realign the charging pump(s) back to the RWST for injection, if recirculation is lost. In addition, a step will be included to adjust injection rate to meet the core decay heat rate, by throttling the charging pump motor-operated discharge valves. Once the RWST has reached a level where charging pump(s) can no longer take suction from the RWST, the current methodology provided in procedure ECA-1.1 will be used to

align the VCT for makeup via the CVCS blended makeup system. FPL Energy Seabrook will complete these changes to ECA-1.1 for implementation following the six-week duration operator training cycle starting August 18, 2003.

- To support future debris transport analyses performed to address the long term resolution of Generic Safety Issue-191, FPL Energy Seabrook will perform a walkdown of the recirculation flowpaths within the containment building during the upcoming refueling outage (October, 2003).

- The procedure for the containment sump screen inspection will be enhanced to include more details in the acceptance criteria for inspections. Additionally, the procedure will require that, if discrepancies are identified, they are to be dispositioned in accordance with the Seabrook Station corrective action program. These procedure revisions will be completed prior to the upcoming outage (October 2003), which is the next scheduled performance of this inspection.